Polar Orbiting Satellite Sounding Evaluator
User's Guide

Version 2.4

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1.0 Introduction

This document describes the use of the Polar Orbiting Satellite Sounding Evaluator (POSSE) version 2.4. POSSE was developed under contract to the Forecast Products Development Team (FPDT) of the Office of Research and Applications (ORA) of the National Environmental Satellite, Data and Information Service (NESDIS) of the National Oceanic and Atmospheric Administration (NOAA).

POSSE was developed with the intention of being a simplified version of the Environmental Data Graphical Evaluation Imaging System (EDGEIS). EDGEIS is a program which has been used by various groups within ORA for more than a decade to evaluate satellite data. While the capabilities of both programs are similar, POSSE includes fewer tools for evaluating satellite data. The tools that are not included are those which are unlikely to be useful to users outside of ORA.

1.1 Capabilities

The primary purpose of POSSE is to display images that show horizontal cross-sections of the Earth's atmosphere using data from NOAA weather satellites. The layout of the program was designed with this in mind and most program functions use horizontal images as a starting point. POSSE provides a variety of functions that are used to generate and manage horizontal images.

POSSE provides the ability to take a closer look at the data used to create horizontal images. Any location on an image can be selected to obtain additional data associated with the location. When this is done, a graph of all available profiles is displayed. It is also possible to display other raw data associated with the selected location.

In addition to horizontal cross-sections of the Earth's atmosphere, it is possible to display vertical cross-sections of the atmosphere. These cross-sections can cut though the atmosphere between any two points on the Earth. When this is done, the vertical cross-sections will show any available profile data.

1.2 About The Data

NOAA/NESDIS operates a fleet of polar orbiting environmental satellites which provides users with a suite of atmospheric and environmental data. POSSE provides near real time access to some of that data. After data for a single orbit is processed by the Advanced TIROS Operational Vertical Sounder (ATOVS) system, a subset of the data is saved in a file that can be accessed by the POSSE Server. This server is a program running on a NOAA/NESDIS/ORA computer that responds to specific requests for data. These requests come from a variety of programs including POSSE. After a request for data is received, the server extracts the requested data, formats it, and sends the data to the program that made the request. The program then displays the data.

A variety of files are used by the POSSE server. These files contain data from different satellites and different processing systems. Files containing data produced by operational ATOVS systems are generally marked "operational" or "oper". Some files contain data from offline systems that are used

by NOAA personnel to test system and algorithm changes. These are generally marked as “test” or “development”.

Each file is updated approximately 5 to 10 minutes after the orbit has been processed by the corresponding ATOVS system. After the file is updated, the data is available to users of POSSE. It should be noted that orbital data do not always arrive at consistent time intervals, nor do they necessarily arrive in chronological order. Due to delays in the transmission of the data, it is common for 6 hours or more to elapse between the availability of one orbit and the availability of the next. In such cases, two or more orbits often arrive in a short period of time. Therefore, users of POSSE should not be surprised when new orbits do not show up consistently.

2.0 Installing and Running POSSE

POSSE has been designed to run as both an applet and a stand-alone program. When run as an applet from within a web browser such as Netscape or Internet Explorer, some features will not be available. These features include the ability to save and print images. Because applets are subject to strict security restrictions, a decision was made to not include these features in the applet. Users who wish to use such features will need to use the stand-alone version.

Running POSSE as an applet does not require any work on the part of the user other than going to the POSSE web page which is currently located at:

http://poes.nesdis.noaa.gov/posse

When the applet is selected from the web page, it will start to load automatically. Once the program is loaded it will then start running.

It should be noted that some users may experience problems when attempting to run the applet. Some older browsers (such as Netscape 4.x) use a version of Java that is no longer supported. Most, if not all, current versions of web browsers should support recent versions of Java. Some users may also experience problems caused by the use of proxy servers or certain firewall settings. Adjusting the settings may help. If not, the use of the stand-along version of POSSE is recommended.

The stand-along version can be obtained by downloading it from the POSSE web page. When it is downloaded, the file POSSE.jar will be downloaded onto the local computer. This file can be placed in any convenient location.

There are two methods available for running POSSE. The first method is to go to the command line, switch to the directory that contains Posse.jar, and type the command:

```
java –jar Posse.jar
```

The second way to run POSSE will usually be the easiest. On most operating systems all you need to do is double-click the Posse.jar icon just like you would if you were running any other program. This will kick off Java and start running POSSE.

Running POSSE On A Macintosh

If you want to run POSSE on a Macintosh, you must use Mac OS X. Systems 9.x and earlier will not be able to run POSSE. If you are running OS X then you do not need to install Java because it will already be installed and set up by default. Should you wish to update your version of Java, you may do so by using Software Update or by visiting Apple's Java page at http://www.apple.com/java/

2.1 System Requirements

POSSE should run on any computer that is capable of running Java programs. This includes, but is not limited to, all versions of Windows, Mac OS X, Linux and most versions of Unix.

There are no specific requirements concerning the amount of disk space that must be available. The program itself requires less than 1 megabyte of disk space. The memory footprint used by EDGEIS will vary depending on the size of the main window. In most cases the program will require approximately 50 megabytes of memory.

Internet access is required to run POSSE. All of the data displayed by the program are obtained from a data server belonging to NOAA/NESDIS/ORA. Without access to the Internet, it is not possible to obtain any data. A fast Internet connection is recommended but is not required. Image data sent by the server will usually be at least 1 megabyte per image. For dialup users, this will result in delays while the data is being sent.

2.2 Obtaining And Installing Java

In order for POSSE to run as a stand-along program, Java must be installed on your computer. This section will provide a brief description of how to obtain and install Java. But it is the responsibility of each user to make sure that Java is installed correctly.

To determine whether or not Java is installed on a computer, go to the command line and type the command:

```
java –version
```

If Java is installed, this command will generate a message that describes the version of Java that is installed. If Java is not installed, it will generate an error message stating that the command was not found. It should be noted, however, that it is possible for a command not found message to be generated even if Java is installed. This will occur when the java command is not located within the current path. If this is the case, then you will need to make sure that your path is updated to include the java command.

If Java is not installed, it can be obtained by going to the web site:

```
http://java.sun.com/
```

From this page you will need to locate the download. Look for the latest version of Java 2 Standard Edition (J2SE). If you have a choice between downloading the Java Runtime Environment (JRE) and the Software Development Kit (SDK) you should choose the JRE unless you plan to write your own Java programs. Once you download the program, the installation process will usually be straightforward.

3.0 Using POSSE

POSSE has been designed to function just like most window-based programs. The main window will typically appear similar to Figure 1. The bottom of the window contains buttons that are used to access the various options. When running POSSE as an applet, the menu bar will not be available.

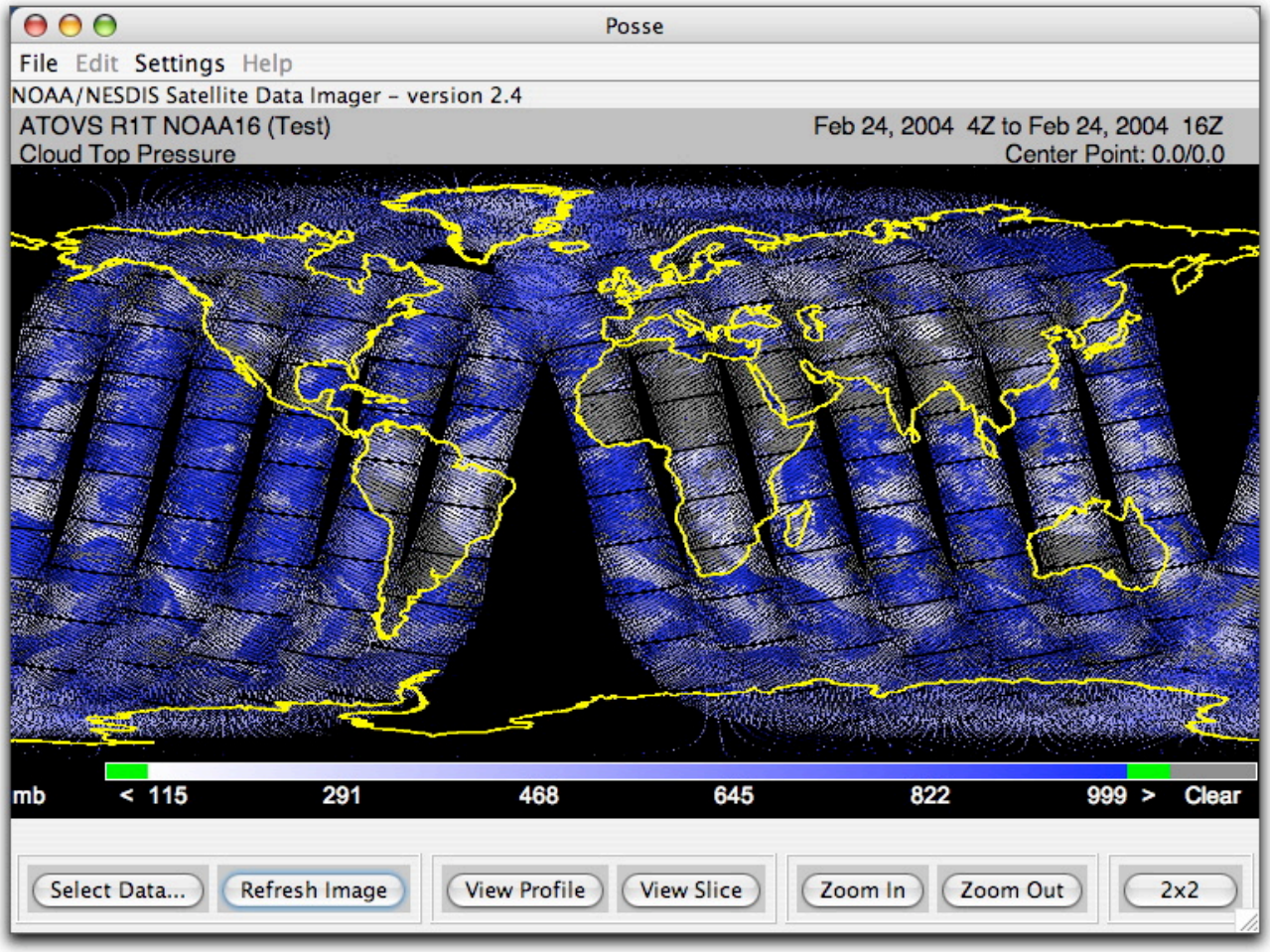


Figure 1 – The typical layout of the main window.
The actual look of the window may vary depending on the operating system used and whether or not POSSE is running as an applet or a stand-alone program.

The main part of the window contains one to four images. Information about the images is shown at the top of each image. Underneath each image is a color scale that shows which values are represented by the various colors.

The buttons along the bottom of the window perform the following functions:

- Select Data: Selecting this button will cause a dialog to be displayed that allows you to select which data to display and how to display the data.

- Refresh Image: This button provides the ability to manually refresh an image. Doing this will result in the image being recreated using the same settings. If any new data has arrived since the last time the image was created, the new data will also be displayed.

- View Profile: After this button is selected, any location in the horizontal image can be selected. A graph of all profiles located at the selected location will then be displayed.

- View Slice: When this button is selected, a line can be drawn between any two points on the horizontal image. A vertical-cross section of the atmosphere will then be displayed.

- Zoom In: Selecting this button and then clicking on the image will result in a new image being created that shows a zoomed in view at the selected location.

- Zoom Out: This button performs the opposite function as the zoom in button.

- 2x2 / 1x1: POSSE can display either one large image or 4 smaller images arranged in a 2x2 grid. This button toggles between the two options.

3.2 Creating And Modifying Horizontal Images

Horizontal images are created and modified using the data selection dialog (Figure 2). To bring up the dialog, press the "Select Data" button at the bottom of the main window. The dialog contains a collection of controls for each image in the window. In each panel within the dialog the controls on the top, from the data server lists to the time window, are used to indicate which data is to be used to create the image. The remaining controls are used to indicate how the data are to be displayed.

Because of the large number of controls within the data selection dialog, it is sometimes the case that there is not enough room to fit everything. POSSE will attempt to make everything fit by reducing the font size but this may make the text difficult to read. This problem can be reduced by resizing the dialog to make it bigger.

The functions of each control within the dialog are:

Data Server lists:
Two drop-down lists appear when data server button is selected. At any time there may be one or more data servers available from which data can be retrieved. A list of available servers appear in the first drop-down list. The second list contains the names of all satellite systems available on the selected data server.

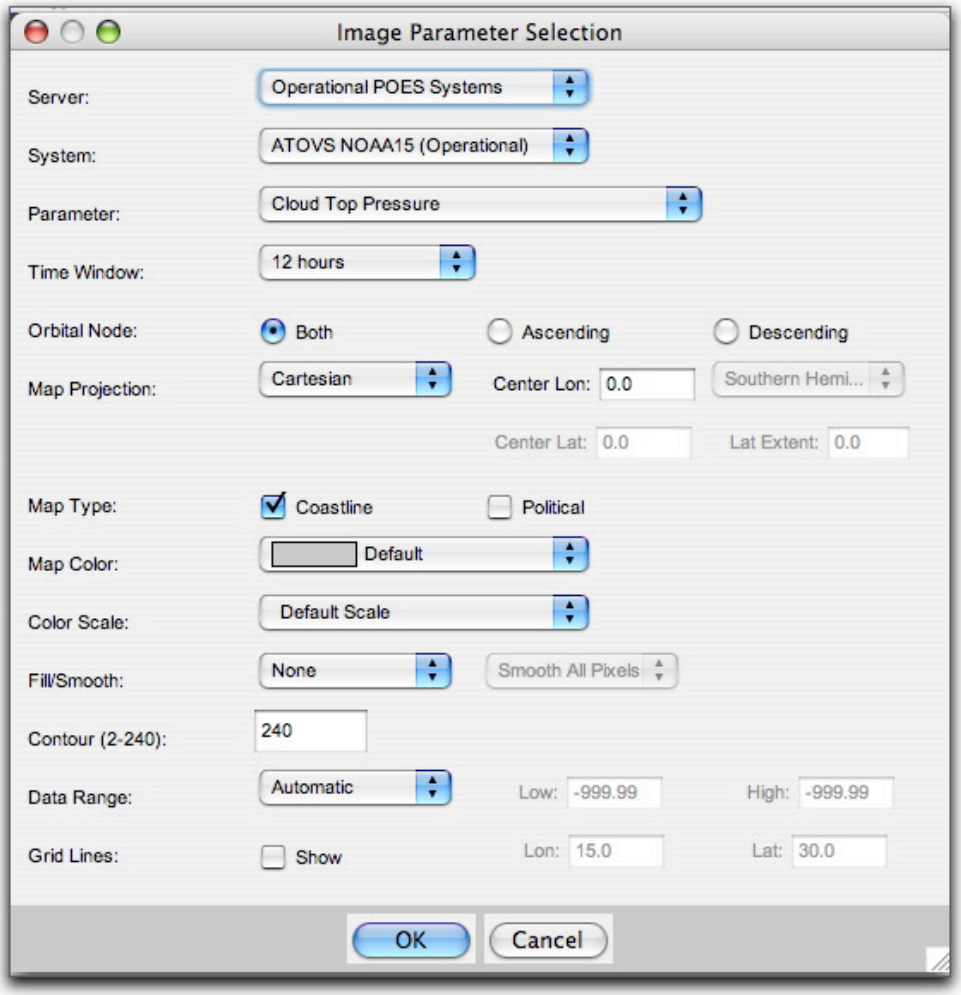


Figure 2 – The Data Selection Dialog.
The controls at the top of the dialog are used to select the source of the data used to create the image. The controls at the bottom are used to change the manner in which the data is displayed. If the window contains more than one image, this dialog will be divided into panels, each of which will represent the corresponding image in the window.

Parameter list:
When a source of the data is selected, a list of available parameters will appear. This list contains the names of every available parameter.

Time Window:
The time window controls are used to restrict the amount of data displayed. If the time window list is set to 6 hours, 12 hours, 18 hours or 24 hours, then the only data to be displayed will be data that falls within the previous selected number of hours. For example, if the time window is set to 12 hours and the current time is 1400 local, then only the data that falls between 0200 local and 1400 local will be displayed.

The time window controls provide great flexibility when limiting the amount of data displayed. The flexibility, however, comes at the cost of potential confusion. Because the end of the time window is based on the current time, it is possible for the amount of data displayed in an image to change even though the time window has not been changed. This will occur at the top of every hour.

Orbital Node:
If the source of the data contains orbital node values, it is possible to restrict the display of the data to only show either the ascending nodes or the descending nodes. This is done by selecting the appropriate radio button. If the "Both" button is selected, then all of the data will be displayed regardless of the orbital node.

Map Projection:
Each image can be displayed using one of five available projections. The projection is selected by picking the desired projection from the drop-down list. Depending on which projection is selected, one or more controls to the right of the drop-down list will be enabled. The ones that are enabled provide more flexibility in displaying the image.

For more information about each projection, see Appendix B.

Map Type/Color:
The type of map and the color of the map are adjusted using the map type and color controls. Two checkboxes are used to turn the map types on or off. If the coastline box is selected, then the outlines of the continents will be drawn on top of the image. If the political box is selected, geo-political boundaries such as states and countries are drawn on top of the image.

Each parameter uses a default map color. This color can be changed by picking another color from the list of colors that is located to the right of the political checkbox.

Color Scale:
Each parameter has a default color scale associated with it. The selected scale can be changed to another scale by picking a different scale from among the list of scale in the color scale drop-down list. The list will contain the default scale and two grayscale scales.

Smoothing/Contour:
In default mode, each data footprint is drawn on the image using the footprint size. There are times, however, when it may be desirable to smooth the image. This is done by adjusted the smoothing controls.

The first drop-down list controls the amount of smoothing applied to the image. POSSE smoothes images by applying area-averaging to each pixel in the image. In other words, an average of the pixels around a particular pixel is calculated and the value of the pixel is set to the average. The amount of pixels used in the averaging can be changed by setting the smoothing to a value between 1 pixel and 10 pixels. The greater the number of pixels, the greater the smoothing will be.

The second drop-down list controls the type of smoothing. If “smooth” is selected, then smoothing will be applied to every pixel in the image. If “fill only” is selected, smoothing will only be applied to those pixels that do not already contain data.

In addition to smoothing, the number of colors used in the image can be changed to a value between 2 and 240 by changing the value in the contour field. When this value is set to a relatively small number the image, in effect, becomes contoured. This can be especially effective when combined with smoothing (Figure 3).

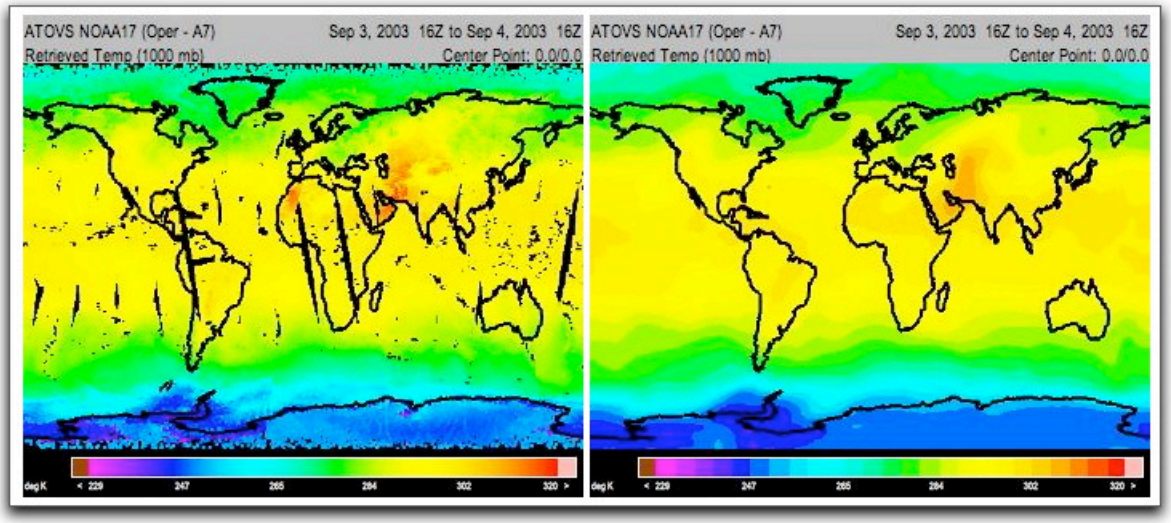


Figure 3 – Smoothing And Contouring.
Applying both smoothing and contouring to an image can produce dramatic and often useful results.
The image on the left shows an unsmoothed image with no contouring.
The image on the right shows the same data with a high amount of smoothing and a contour of 20.

Data Range:
The minimum and maximum values in the color scale can be adjusted using the data range controls. There are two options available. The first option is the automatic option. When this is selected, the actual minimum and maximum values in the data will be used as the endpoints of the color scale. The second option is the manual option. When this is selected, the low and high text fields will be enabled. Values entered in these fields will then be used as the endpoints of the color scale.

Grid Lines:
Grid lines will be drawn on top of the image at selected latitudes and longitudes if the grid line checkbox is selected. The distance between the grid lines can be adjusted by changing the values in the latitude and longitude fields.

3.3 Zooming In and Out

Zooming, both in and out, can be applied to any horizontal image. Zooming is turned on by selecting the appropriate button at the bottom of the window. After zooming is turned on the cursor will change to a magnifying glass with either a plus sign or a minus sign, depending on the zooming direction. At this point, any location on the image can be clicked on and zooming will occur at the selected position.

When zooming in, the zoom amount will be increased by a factor of 2. After the image is rebuilt, zooming can be performed again and the zoom amount will again be increased by a factor of 2.

Zooming out behaves in the same manner as zooming in, except that the zoom amount is decreased by a factor a 2 each time it is done. If it is no longer possible to zoom out any further, zooming out can still be done but will not have any effect on the zoom factor. It will, however, have an effect on the image. Because the map is centered on the selected location after each zoom, zooming out when the entire Earth is visible will essentially re-center the map on the selected location.

If several levels of zooming in have been applied to an image, it is possible to zoom all of the way out in one step. This is done by pressing and holding the Control key while clicking on the image.

3.4 Viewing Individual Profiles

POSSE provides the ability to view individual profiles at any location that contains profile data. When a location is selected, the program will search the file for data that is closest in distance to the selected location. The necessary data is then read and a window will appear that contains a graph of every available profile in the file as well as other selected data.

3.4.1 Selecting A Profile

To view individual profiles, the profile function must be turned on by selecting the "View Profile" button. This will result in the cursor being changed to a profile cursor (Figure 4) when it is over a horizontal image that was generated from a file containing profile data. If the file from which the image was generated does not contain any profile data, the cursor will change to a red X.

Applying Zooming, Profile Selection and Slice Selection To All Images

If the main window contains more than one image, there will likely be times when you want to apply zooming to each image in the frame instead of just one. This can easily be done by pressing and holding the Shift key while clicking on any of the images. If this is done, each image will be recreated and will use the selected image's zoom factor to determine the amount of smoothing. As a result, each image will show the same amount of zooming and will also show the same Earth location.

Pressing and holding the Shift key also works when selecting individual profiles and vertical cross-sections. In these cases, holding down the Shift key and making the appropriate selection will result in profiles and vertical cross-sections from each image in the frame.

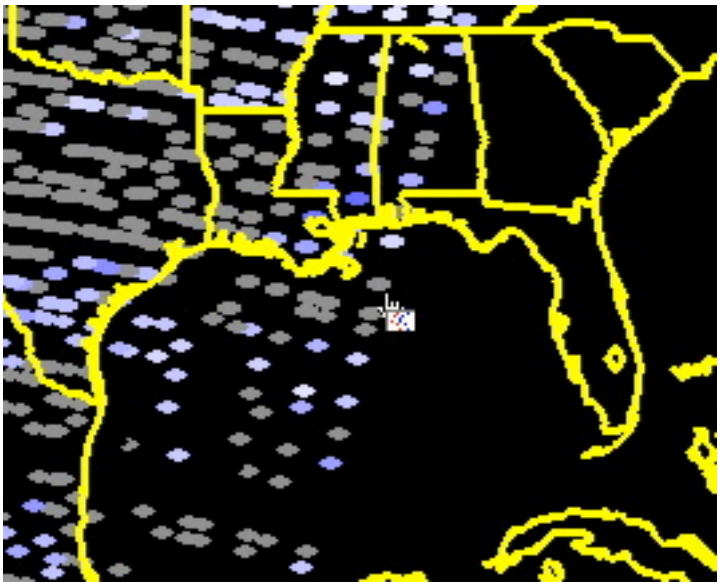


Figure 4 – Selecting Individual Profiles.

After turning on the profile selection function, the cursor will turn into a hand with a profile graph on top of it. At this point, clicking anywhere on the horizontal image will result in the generation of a graph showing all available profiles from the data point that is closest to the selected location.

If the cursor is a profile cursor, then you can select a location by clicking on the image. The spot that the hand is pointing to will be the selected location. After the location is selected a window will appear. Depending on the location of the data and the size of the file, there may be a delay ranging from less than a second to several seconds or more while the program searches for the nearest retrieval and reads the appropriate data. If no retrievals were found near the selected location, a warning dialog will appear and the window will go away. It will then be necessary to select another location.

If the main window contains a single horizontal image, then the profile window will contain a single graph. If the main window contains more than one horizontal image the profile window will still contain a single graph. The data for the graph will come from the file that the image was created from. If there is more than one horizontal image in the main window, it is possible to create graphs for each image in the main window. This is done by holding down the shift key while selecting a location in one of the images. If this is done, the profile window will contain graphs for each image in the window using the same location for each one.

Searching For Matching Profiles

It is not necessary to click directly on top of a data footprint when selecting a location. POSSE converts the x/y coordinate that was clicked on into latitude/longitude values. It will then search for data that is closest in distance to this latitude and longitude. The advantage of this is that selecting a location is easier since it is not necessary to be highly precise when clicking on the image. The disadvantage of this method is that it is possible that the profile you end up with may not be the one you wanted. This is especially true if there is a large amount of overlapping data.

3.4.2 The Individual Profile Window

The profile window is a resizable window that contains a graph of the profiles along with selected data associated with the profiles being plotted. The graph area of the profile window contains all of the profiles that are available in the file. Seven different plot types can be used to display the profiles. Four of these plot types are XY plots while three are Skew-T Log-P plots.

Below the graph is a small globe on which is indicated the approximate location of the data. Next to the globe is a legend that shows the color and style of the lines that represent each profile. As the mouse is moved over the graph, the data value of each profile that matches the pressure level is displayed next to the profile description.

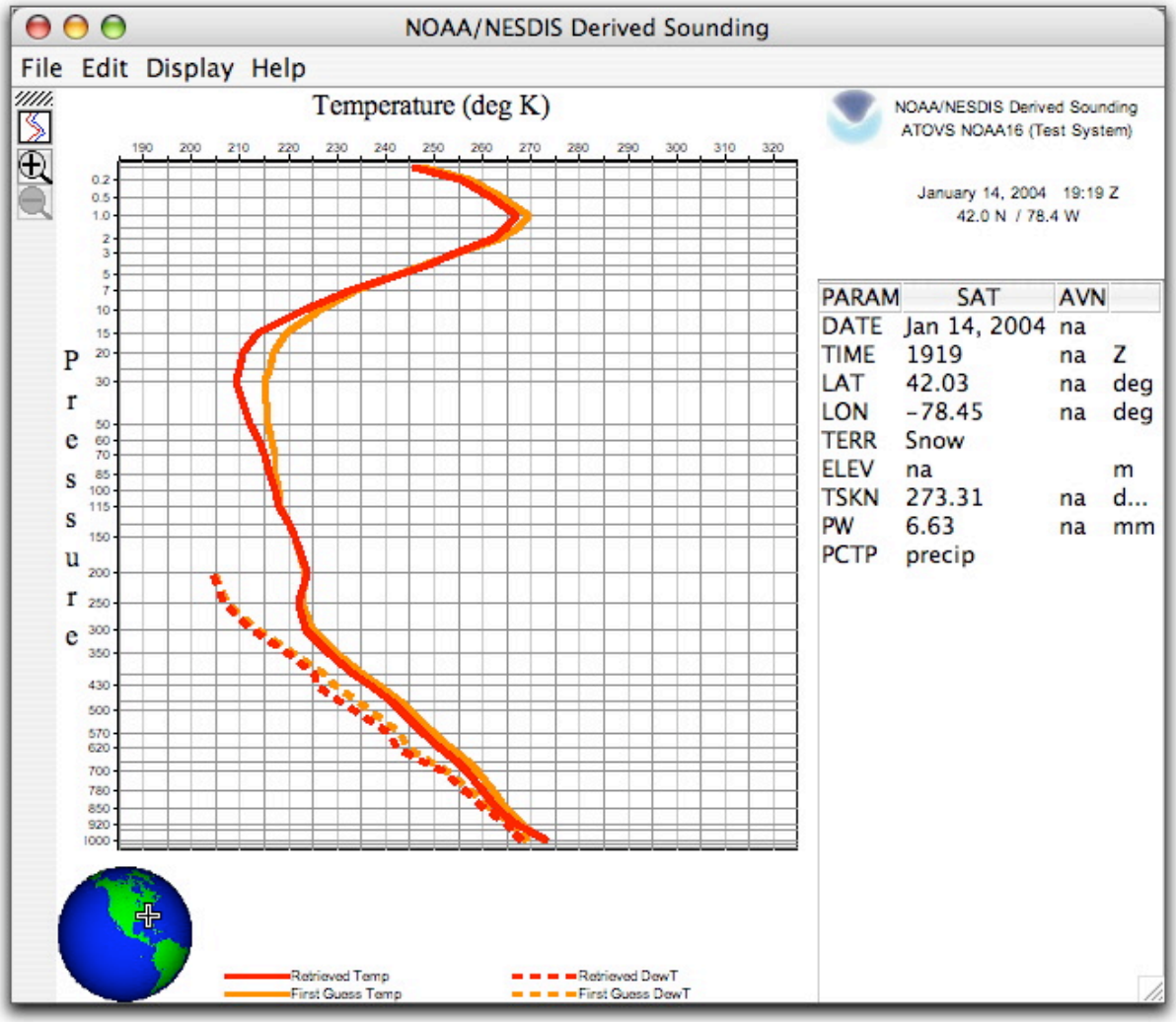


Figure 5 – Individual Profile Window.
The graph shows all profiles that were found for the data point at the selected location. The graph is customizable and can be changed between Skew-T Log-P and several varieties of a standard XY plot. The display of the data on the right may also be customized.

The right-hand side of the window contains selected data associated with the selected location. Most of this information is presented in a table. Depending on the type of data presented, the value may or may not fit within the available space. If there is not enough space to display all of the data, then a scrollbar will appear on the side of the table. The width of each column in the table can be changed by moving the mouse pointer to the table header. When the cursor moves directly over the division between two columns, it will change. At this point it is possible to click and drag the column divider to either the left or right to change the width of the two columns.

3.4.3 Changing The Display Of The Profile Window

The manner in which the data is displayed is very flexible. To change the display of the graph, either click the graph icon in the toolbar or select "Change Graph" from the Display menu. Both of these options will bring up a dialog (Figure 6) containing various display options. There will be one panel in the dialog for each panel in the profile graph window.

The top of the dialog shows the seven available plot types. Images of each plot show the approximate position along the pressure axis of selected pressures. The plot type is selected by clicking on the image of one of the plot types. When a new plot type is selected, the graph in the profile window will be updated automatically to show how the data looks given the new choice of plot type.

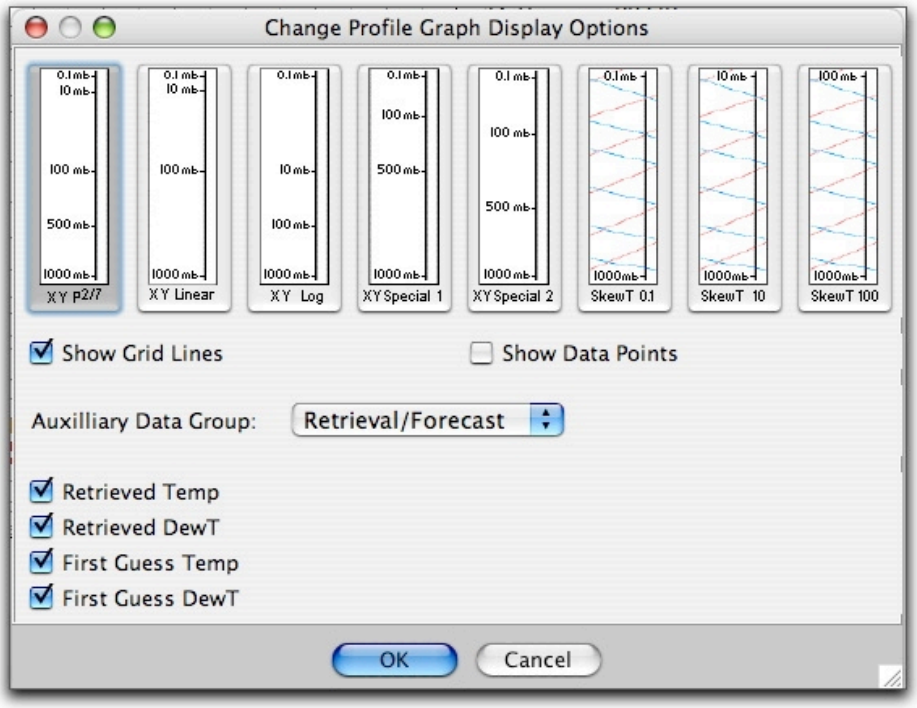


Figure 6 – Changing The Display Of A Profile Graph
The type of plot used to display individual profiles can be changed using this dialog.
The five plots on the left are XY plots. The three on the right are SkewT LogP.
In most cases, either the left plot type or right plot type will be used.
The other types are included to provide greater flexibility if it is needed.

The five plot types on the left of the dialog are standard XY plots. The $P^{2/7}$ plot type plots the pressures raised to the $^{2}/_{7}$ power. This results in a plot with 100 mb roughly centered vertically. The Linear option plots the pressures on a simple linear scale from 0.1 mb to 1000 mb. This plot type emphasizes the lower atmosphere while greatly de-emphasizing the upper atmosphere. The Logarithmic plot type displays the pressures on a $\log_{10}$ scale which emphasizes the upper atmosphere at the expense of the lower atmosphere. The Special 1 and Special 2 scales are modified linear scales. They both contain three separate linear scales: 0.1 mb to 100 mb, 100 mb to 500 mb, and 500 mb to 1000 mb. Special 1 places 100 mb 25 percent of the way from the top of the graph to the bottom while placing 500 mb at the center point of the scale. Special 2 places 100 mb at 33 percent of the way from the top to the bottom and 500 mb at 66 percent. Both of the scales were designed with the intention of finding a scale that showed both the upper and lower parts of the atmosphere without overemphasizing one or the other.

The three plot types on the right side of the dialog are skew-temperature log-pressure scales. Each scale plots the profile data using standard skew-t log-p calculations. The difference between the three scales is the upper pressure level allowed. The 100 mb scale only plots the data up to 100 mb while the 10 mb scale only goes up to 10 mb. Any profile data above these levels are ignored.

When a standard XY plot is being used, it is possible to display grid lines at each major pressure and data level. This is done by selecting the “Show Grid Lines” option under the Display menu. For all types of graphs, the “Show Data Points” menu item can be selected. This will result in circles being drawn showing the location of each point that makes up the profiles. When this option is turned off only the profile lines are displayed.

Underneath the plot types in the dialog are two checkboxes: “Show Grid Lines” and “Show Data Points”. The grid line box turns the display of grid lines on and off (this option is disabled when a Skew-T Log-P plot is selected). The data point box turns the display of data points on or off. When this is selected, the graph will show the actual data points that we used to create the profiles.

Beneath the checkboxes is a list that will contain one or more groups of auxiliary data. Depending on the source of data there may be several groups of data available. The data from the chosen group is displayed in the table to the right of the graph.

At the bottom of the dialog are checkboxes representing each of the available profiles. The profiles that are selected will be displayed in the graph.

The “Zoom In” and “Zoom Out” menu items and toolbar buttons control the amount of zooming within the profile graph. Every time one of these is selected, each graph will zoom in or out by a factor of 2. It is possible to zoom in on a graph up to three times. When the amount of zooming is greater than 1, scrollbars will appear on the right-hand side and bottom of the graph. These allow the graph to be moved around to focus on a particular area. Another way to move around when the graph is zoomed is to move the mouse over the graph and then click and drag the mouse. The image will pan in response to the dragging of the mouse.

3.5 Viewing Vertical Cross Sections

Vertical cross-sections (slices) of the atmosphere can be created between any two points on the Earth's surface. When a cross-section is created, the line representing the cross-section is divided into 100 points. The file is then searched to find data points that are closest to each of the 100 points along the line. Profile data is read from each of the nearby data points and then a graphical representation of the profile data is displayed.

3.5.1 Selecting A Vertical Cross-Section

To view vertical cross-sections, the slice function must first be turned on by selecting the "View Slice" button. Once this is done the cursor will change to a slice cursor when it is over a horizontal image that was generated from a file containing profile data. If the file from which the image was generated does not contain any profile data, the cursor will change to a red X.

To draw the line at which the vertical cross-section should be made, click on the image at the start of the line and, while keeping the mouse button pressed, drag the mouse to the end point of the line. As this is done a rubber band line will appear on top of the image. The final position of this line will be the location of the slice.

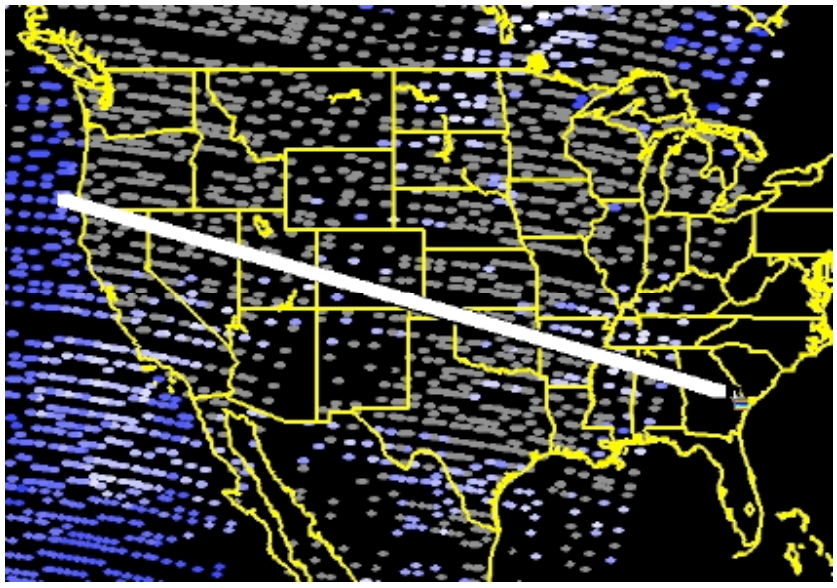


Figure 7 – Creating A Slice.

Creating a vertical cross-section is done by drawing a line across a horizontal image at the location of interest. The values used to create the cross-section will come from the data points that are closest to the line.

If the main window contains more than one image, then a cross-section will only be created for the image that the line was drawn on top of. However, if the shift key is held down while the line is being drawn, then the vertical cross-section window will contain a cross-section corresponding to each image in the main window. Each cross-section will be created using the same line.

3.5.2 The Vertical Cross-Section Window

The vertical cross-section window shows an image of the Earth's atmosphere (Figure 8). The Y axis of the image corresponds to pressure levels. The X axis of the image matches up with the 100 points along the line. The image may also contain white and brown lines depending on the location of the slice. The white line shows cloud top pressures, if present and available. The brown line shows the pressure at the surface of the Earth, resulting in an approximation of the surface elevation. Any data below the surface is not displayed.

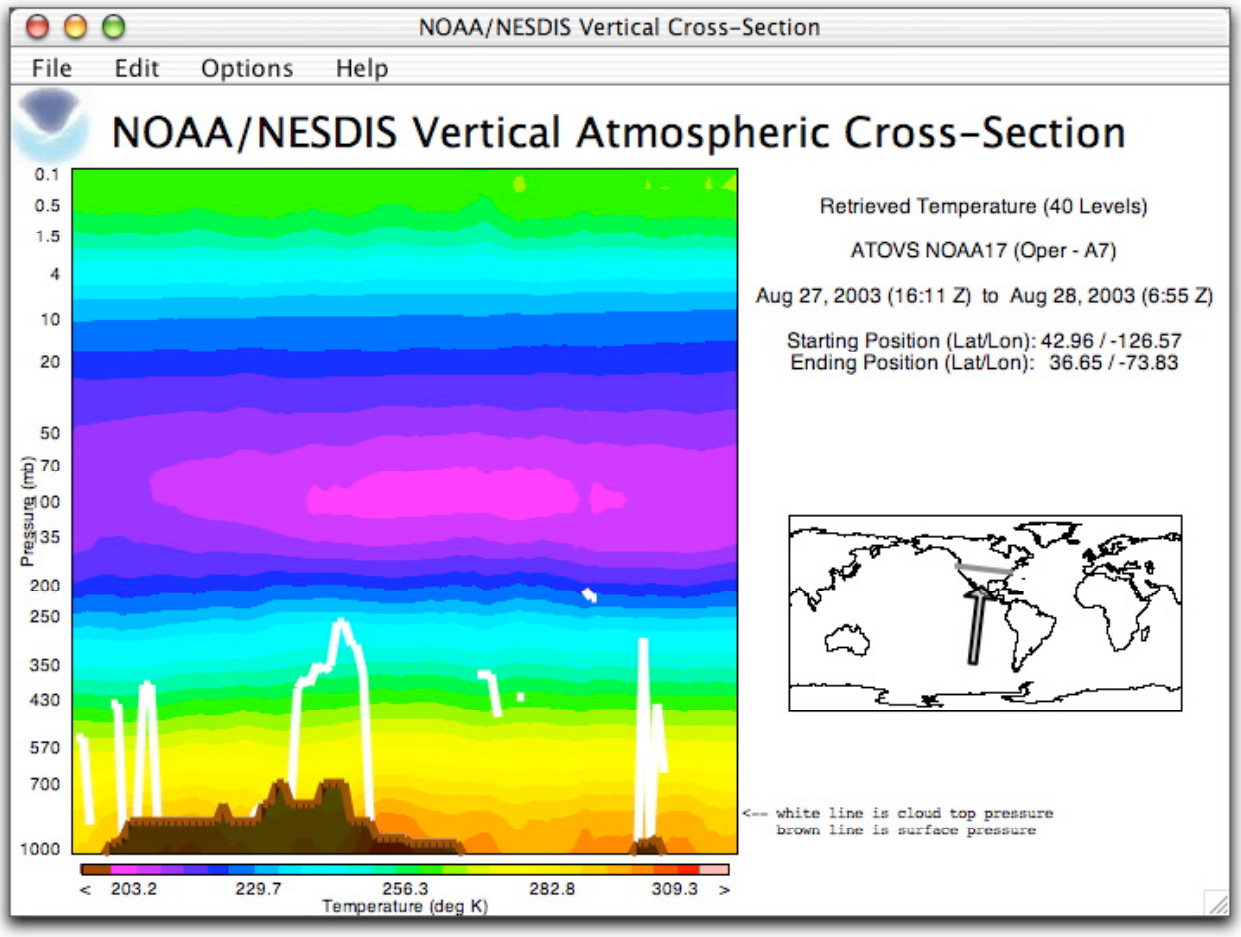


Figure 8 – Vertical Cross-Section Window.
The image on the left shows the cross-section of the atmosphere along the selected line. The right side of the window contains information about the data and a map showing the location of the cross-section. The arrow shows the direction that the cross-section is being viewed from.

To the right of the cross-section is information about the vertical slice. The type of data used to create the slice is displayed along with the number of pressure levels used. The starting and ending times of the actual data are displayed along with the endpoints of the line.

Also to the right of the slice image is a small map that shows where the cross-section is located. The gray line across the map shows the area of the cross-section. The arrow shows the direction that the cross-section is being viewed from. When the slice line is drawn, the start of the line will be on the left of the slice while the endpoint of the line will be on the right side of the slice.

3.5.3 Changing The Display Of The Vertical Cross-Section Window

When a vertical cross-section is done for the first time the resulting slice image will usually show unsmoothed temperature data. The type of data displayed and the manner in which it is displayed can be changed by selecting the "Change Panel Options" menu item which is located under the Options menu. This will bring up a dialog that will allow the settings to be changed (Figure 9).

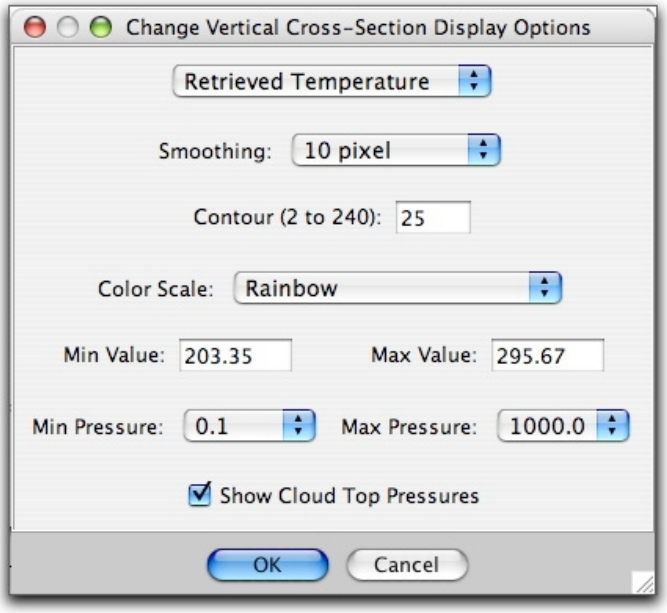


Figure 9 – Changing The Slice.

The vertical cross-section contains data for each available profile. The profile data being displayed is changed by selecting a new profile from the top list.

Smoothing and contouring can also be applied in the same manner that they can be applied to a horizontal image. The color scale, data range and pressure range are also adjustable.

If the data source contains values for cloud top pressures, the display of these can be turned on or off by selecting or deselecting the box.

The first item in the dialog contains a list of every profile that is available in the file. The type of data can be changed by selecting a different profile in this list.

The image can be smoothed by changing the setting in the smoothing list. The smoothing is done using area averaging, so the larger the selected value the more the image will be smoothed.

An image will typically contain 240 different colors. The number of colors can be reduced by changing the value in the contour field. This will result in a contoured image similar to the one shown in Figure 8.

The color scale defaults to a standard rainbow scale (purple to blue to green to yellow to orange to red). This can be changed to black and white scales that either go from black to white or from white to black.

The minimum and maximum data values of the selected profile are listed in the minimum and maximum fields. If these values are changed, then the range of the color scale will be adjusted accordingly.

After the data value fields are two drop-down lists that represent the minimum and maximum pressure levels. The selected minimum pressure will be the pressure that is displayed at the top of the slice image. The selected maximum pressure will be the pressure that is displayed at the bottom of the slice image. These options can be used to restrict the display of the slice in order to remove pressure levels at the top or bottom of the image.

If either pressure level is set to a value that is not available in the data, then the largest or smallest pressure from the data will be used as the limit. For example, if the data only goes up to 200 mb (such as water vapor) and the minimum pressure is set to 10 mb, then the minimum setting will be ignored and the 200 mb data will be displayed at the top of the slice.

The last option in the dialog will turn the display of the cloud top pressures, if available, either on or off. When cloud top pressures are displayed, white lines will appear on top of the slice image showing the locations of cloud tops.

4.0 Additional Features

POSSE contains a variety of features that apply to the entire program. Some of these features provide useful functionality such as printing and saving images. Others exist in order provide some flexibility in the display of data and in the manner in which the program runs.

4.1 Printing

The stand-along version of POSSE provides the ability to print any image. This includes horizontal images, vertical cross-sections and individual profile graphs. These images can be printed to any printer that the computer has access to.

The orientation of the page can be changed between landscape and portrait using the page setup option. This is accessed by selecting "Page Setup" under the File menu and will bring up a dialog that will allow you change the orientation of the page. Depending on the operating system being used, this dialog may also allow you to select a printer, change the page margins, change the paper size, and scale the image.

A preview of the printed image can be viewed by selecting "Print Preview" under the File menu. A window will be created that shows what the printed image should look like.

The actual printing of an image is done by selecting "Print" from the File menu. This will bring up a print dialog that allows you to make final changes to the settings before printing the image. Some operating systems provide the ability to print the images as a PDF file. If this option is available, there will be a button at the bottom of the print dialog (Figure 10) that saves the image as a PDF. Clicking this button will result in a save file dialog prompting you to name the file.

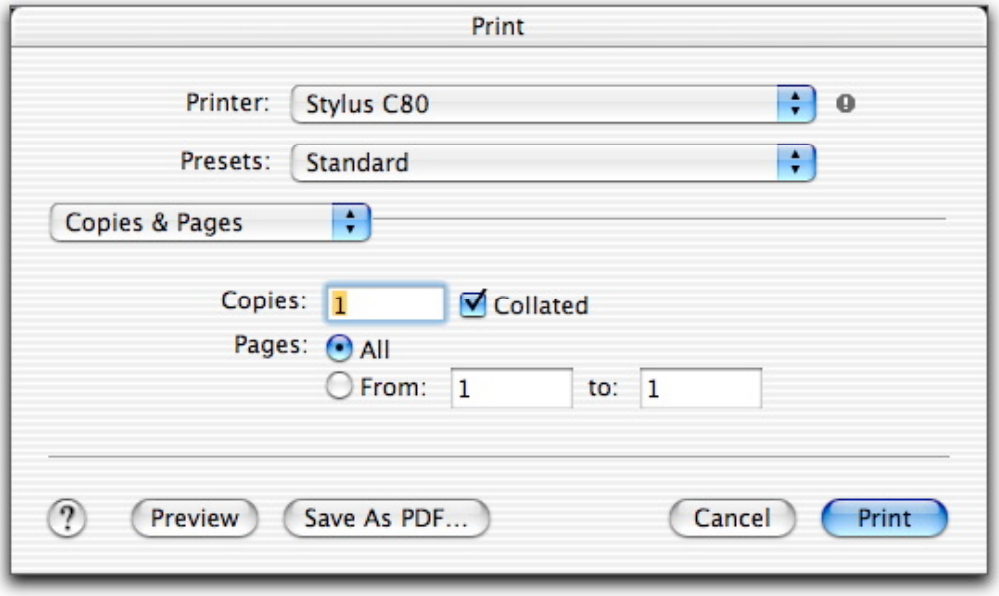


Figure 10 – Print Dialog.
This image shows a typical print dialog. The actual dialog will vary depending on the operating system being used.

4.2 Saving Images

With the stand-along version of POSSE, all horizontal images, vertical cross-sections and individual profile graphs can be saved as an image file (currently in jpeg format only). This is done by selecting "Save As Image" from the File menu. A dialog will appear (Figure 11) that lets you choose the size of the image.

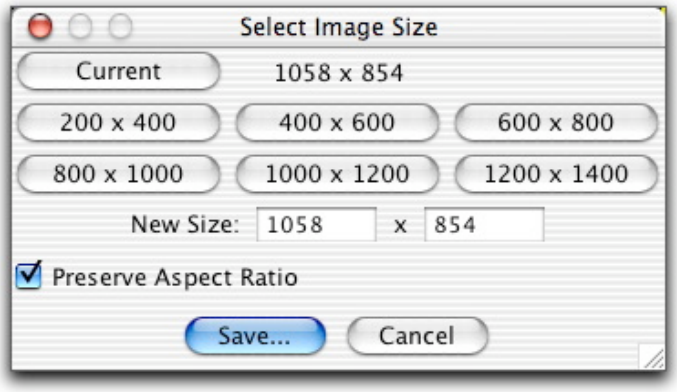


Figure 11 – Image Size Dialog.

Images can be saved at any size. The current button will set the image size to the size of the image on the screen. The other buttons can be used to quickly select common sizes. Any other size can be used by changing the values in the text fields.

If the "Preserve Aspect Ratio" box is selected, then the resulting image will use the same width to height ratio as the image has on the screen.

The initial size of the image will be the same size as the image on the computer screen. The size can be changed by selecting one of the pre-defined size buttons or by entering new values in the "New Size" fields. If "Preserve Aspect Ratio" is selected, then the size of the image will be automatically adjusted to force it to have the same aspect ratio (width divided by height) as the current image.

There are no limits to the size of the resulting image. Please be advised, however, that large size values (typically larger than 2000 x 1000) will result in very large images. It is also possible to enter very small values. But this could result in an image with text that is difficult to read or garbled. POSSE tries to fit all information into the available space. But if the amount of available space becomes too small nothing can be done to make everything fit and be legible at the same time.

After the size of the image is selected, a save file dialog will appear. After the location and name of the file is entered, the image is saved.

Selecting Image Sizes

The ability to change the size of saved images was added because it is often desirable to create an image that is a specific size. This often happens when creating images for use in presentations or papers. While it is possible to create an image at a default size and then resize the image at a later time, this usually produces images that are pixilated or missing data. It is usually a better idea to create an image at the necessary size from within POSSE. The text and thin lines within the image will almost always look better.

4.2 Refreshing Images

The stand-along version of POSSE provides two methods for refreshing an image in order to display the most recent data. An image can be refreshed manually or automatically. The applet version of POSSE only provides the ability to manually refresh images.

To manually refresh an image, select the "Refresh Image" button. The cursor will then change. Any image clicked on when the manual refresh mode is turned on will be recreated using the same settings. When more than one image is being displayed, it is possible to update all of the images simultaneously by holding down the shift key while making a selection.

When using the stand-alone version of POSSE, it is also possible to set up the program to automatically refresh the image or images currently being displayed at variable time intervals. This is done by selecting "Turn Auto Refresh On" under the "Settings" menu. This will bring up a dialog containing a drop-down list of various time intervals. After a desired time interval is selected, POSSE will refresh the images being displayed using the selected interval. POSSE will continue to refresh the images until the automatic refresh option is turned off by selecting the automatic refresh option in the Settings menu again.

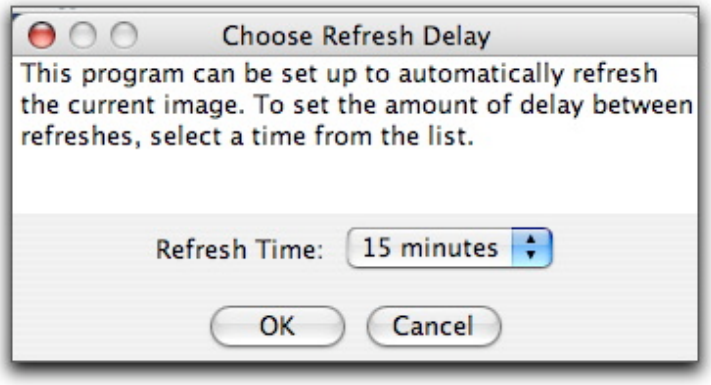
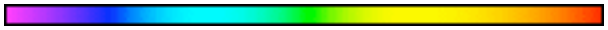
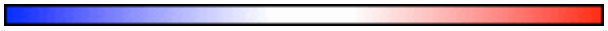


Figure 12 – Refresh Rate Dialog.

The delay between automatic refreshes is set by choosing a time interval from the drop-down list.

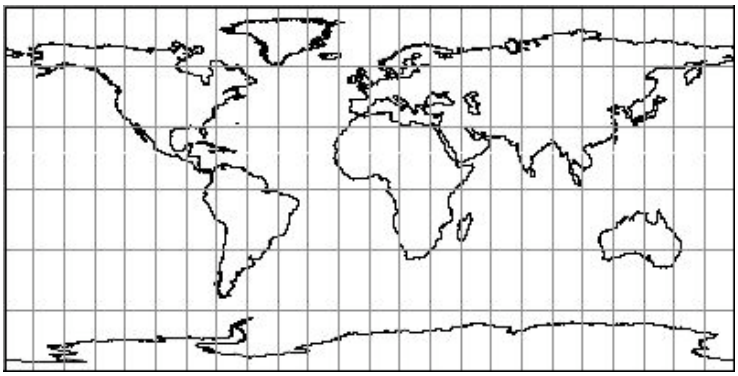
While the automatic refresh option remains on, certain changes will cause the time interval to be reset. This happens whenever the image is changed, either by selecting new data to display, refreshing the image manually, or zooming. When the image is changed, the timer will be reset to the selected interval. The automatic refreshing will then continue using the new image settings.

Appendix A — Pre-Defined Color Ramps

Ramp Number	Ramp Appearance	
0		Use the scale provided in the data block header
1		Rainbow
2		Cloud (white to blue)
3		American
4		Precipitation
5		10 Color
6		Terrain
7		Cloud Mask
8		Grayscale (white to black)
9		Grayscale (black to white)
10		Cloud (blue to white)

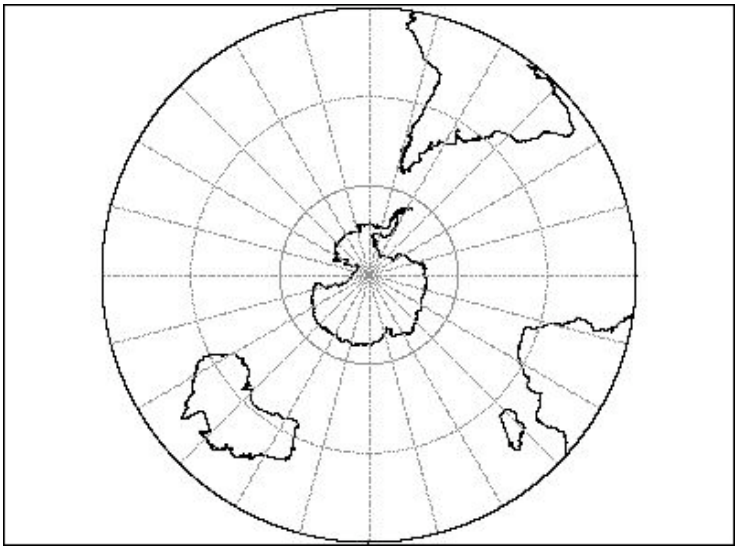
Appendix B — Map Projections

Cartesian



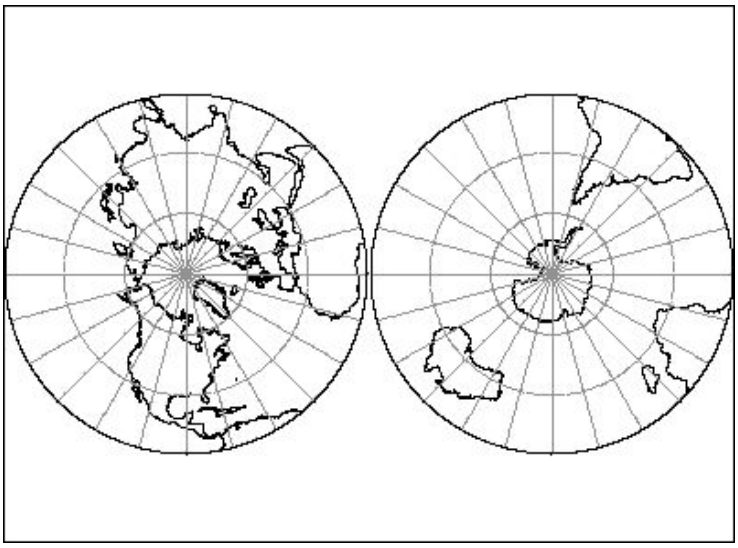
The Cartesian projection is the default projection used by POSSE. The longitude of the center of the map is set to 0 degrees by default. This can be changed by setting the value of the center longitude to another longitude.

Polar



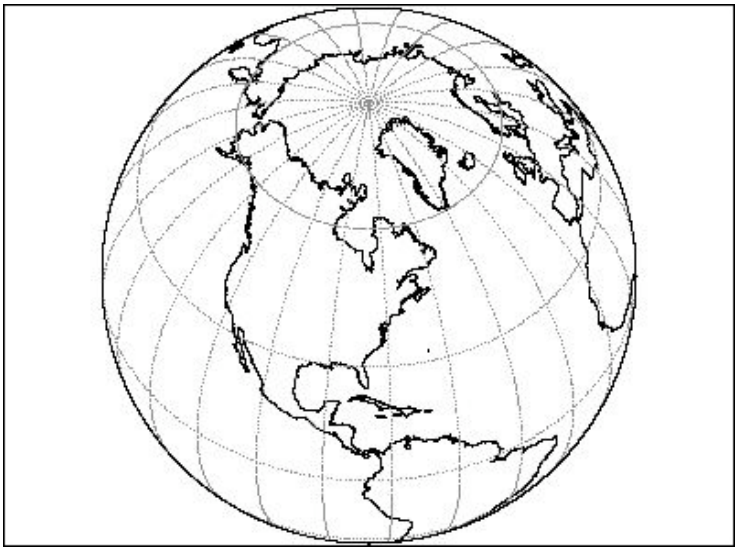
The Polar projection displays either the northern hemisphere or the southern hemisphere. When this projection is chosen, it is possible to set the value of the latitude extent, which limits the amount of the hemisphere that is showing. For example, if the latitude extent is set to 30 degrees, then the resulting map will show the hemisphere from the pole to 30 degrees.

Dual Polar



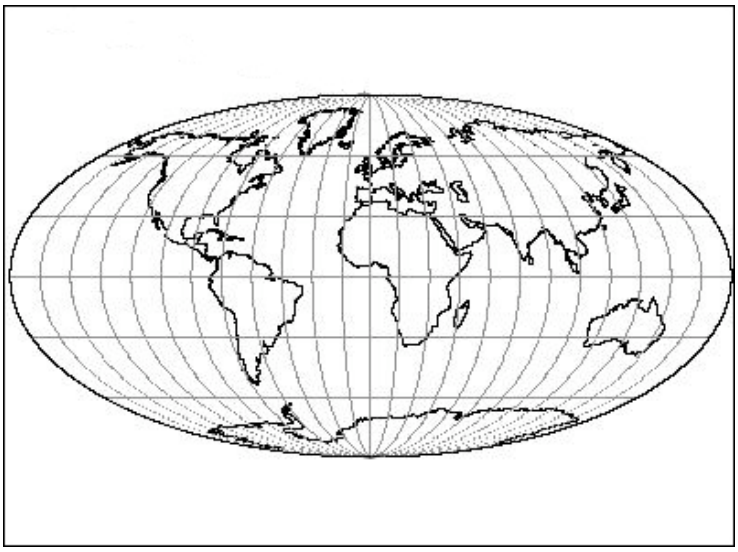
The Dual Polar projection is similar to the Polar projection. The difference is that this projection shows both hemispheres at the same time. As with the Polar projection, the latitude extent can be used to limit the amount of the hemisphere that is visible.

Orthographic



The Orthographic projection simulates a point-of-view perspective. Using this projection is like looking at a globe above any point. The center latitude and longitude values are used to select the spot on the Earth that the image should be centered on.

Mollweide



The Mollweide projection shows an elongated view of the Earth. By default, the image is centered at 0 degrees longitude, but this can be changed by setting the center longitude to another value.